

COMPLETE LISTING OF THE CLAIMS

The following lists all of the claims that are or were in the above-identified patent application. The status identifiers respectively provided in parentheses following the claim numbers indicate the current statuses of the claims.

1. (Original) An actuator comprising:
a first region of piezoelectric material;
a support structure; and
flexures attaching a perimeter of the region to the support structure.
2. (Original) The actuator of claim 1, further comprising first and second electrodes on opposite faces of the first region.
3. (Original) The actuator of claim 2, wherein two of the flexures provide respective electrical connections to the first and second electrodes.
4. (Original) The actuator of claim 2, further comprising:
a second region of piezoelectric material; and
a third electrode, wherein the second electrode is between the first and second regions, the first electrode is on a side of the first region opposite to the second electrode, and the third electrode is on a side of the second region opposite to the second electrode.
5. (Original) The actuator of claim 1, wherein an electric field applied to the region causes crystal structure change in a plane of the region causing the region to dish, where in dishing provides a stroke of the actuator.
6. (Original) The actuator of claim 1, wherein the region is part of a bimorph.
7. (Original) The actuator of claim 1, wherein the region is part of a unimorph.
8. (Original) The actuator of claim 1, wherein a first side of the first region has piezoelectric properties that differ from piezoelectric properties of a second side of the first

region.

9. (Original) The actuator of claim 7, wherein the first side of the region is chemically reduced.

10. (Original) The actuator of claim 1, wherein the support structure comprises a substrate underlying the region.

11. (Original) The actuator of claim 10, wherein the substrate comprises electrically conductive traces that the flexures electrically connect to the electrodes.

12. (Original) The actuator of claim 1, wherein the support structure comprises a frame surrounding the region.

13. (Original) An array of actuators having the recited structure of claim 1.

14. (Original) The array of claim 13, wherein the support structure for each actuator in the array comprises a frame having a hexagonal shape, and the frames are arranged in a hexagonal array.

15. (Original) An actuator comprising:
a region comprising a first layer of piezoelectric material that is between a first electrode and a second electrode; and
a plurality of flexures attached to a perimeter of the region, wherein the perimeter of the region is unsupported except where the flexures attach to the region.

16. (Original) The actuator of claim 15, wherein the plurality of flexures includes:
a first flexure providing an electrical connection to the first electrode; and
a second flexure providing an electrical connection to the second electrode.

17. (Original) The actuator of claim 15, wherein the region further comprises a second layer of piezoelectric material that is between the second electrode and a third electrode.

18. (Original) The actuator of claim 17, wherein the plurality of flexures includes:
a first flexure providing an electrical connection to the first electrode;
a second flexure providing an electrical connection to the second electrode; and
a third electrode providing an electrical connection to the third electrode

19. (Original) A deformable mirror comprising:
an array of piezoelectric actuators fabricated on a substrate; and
a mirror membrane attached to the array of piezoelectric actuators.

20. (Original) The deformable mirror of claim 19, wherein each actuator comprises a bimorph.

21. (Original) The deformable mirror of claim 19, wherein each actuator comprises a RAINBOW.

22. (Original) The deformable mirror of claim 19, wherein each actuator comprises:
a region of piezoelectric material;
a frame surrounding the region; and
flexures attaching a perimeter of the region to the frame.

Claims 23-31 (Canceled)